

Amendments to the Claims:

This listing of claims will replace all prior versions and listing of claims in the application.

Listing of Claims:

1-29. (Canceled)

30. (Currently Amended) A storage system, comprising:

a first storage device coupled to ~~ana~~ first information processing device and having a first controller and a plurality of first disk drives, a first portion of said first disk drives being related to a first logical volume and a second portion of said first disk drives being related to a second logical volume;

said first controller having a first information indicating that said first logical volume functions as a primary logical volume and a second information indicating that said second logical volume functions as a logical volume being used to transfer data;

said first controller receiving data, which are sent from said first information processing device and are targeted to said first logical volume, controlling to store and storing data received corresponding to said data sent from said first information processing device in said first portion of said first disk drives and storing data corresponding to said data sent from said first information processing device in said second portion of said first disk drives receiving a command from said

~~information processing device and transferring data corresponding to said data stored in said second portion of said first disk drives said command to a second storage device, said command being sent from said information processing device to said second storage device and being used to request a pair management information of a first logical volume in said second storage device;~~

said second storage device coupled to a second information processing device and said first storage device and having a second controller and a plurality of second disk drives, a third portion of said second disk drives being corresponding related to a plurality of logical~~third~~ volumes logical volume and a fourth portion of said second disk drives being related to a fourth which have said first logical logical volume~~volume~~; and

said second controller having a third information indicating that said third logical volume functions as a logical volume being used to receive data and a fourth information indicating that said fourth logical volume functions as a secondary logical volume forming a pair relationship with said primary logical volume; and

said second controller controlling to store data in said second disk drives and receiving said data transferred from said first controller and storing data corresponding to said data transferred from said first controller in said third portion of said second storage device and storing data corresponding to said data stored in said third portion of said second disk drives in said fourth portion of said second storage device~~command from said first storage device and replying said pair~~

~~management information of said first logical volume to said information processing device via said first storage device in response to said command;~~

wherein said first storage device and said second storage device change said first information, said second information, said third information and said fourth information based on at least one command sent from said second information processing device so that said second information processing device sends data targeted to said fourth logical volume, if said first information processing device has a failure,

wherein said changed first information indicates that said first logical volume now functions as said secondary logical volume,

wherein said changed second information indicates that said second logical volume now functions as said logical volume being used to receive data,

wherein said changed third information indicates that said third logical volume now functions as said logical volume being used to transfer data, and

wherein said changed fourth information indicates that said fourth logical volume now functions as said primary logical volume~~said first controller receives said command sent from said information processing device at an address, which is different from another address of a second logical volume forming a pair relationship with said first logical volume.~~

31. (Currently Amended) A storage system according to claim 30, wherein:

said first and/or second controller have a pair management information of said first logical volume is information of relationship with said first logical volume and said second fourth logical volume in said second storage device.

32. (Currently Amended)

A storage system according to claim 30, wherein:

said first and/or second controller have a pair management information, which of said first logical volume indicates whether it is under copying data from said first logical volume to said second fourth logical volume in said second storage device or not.

33. (Currently Amended) A storage system according to claim 30, wherein:

said first and/or second controller have a pair management information of said first logical volume is whether it is under restoring data from said first logical volume to said second fourth logical volume in said second storage device or not.

34. (Currently Amended) A storage system according to claim 30, wherein:

said first controller has a pair management information of said first logical volume is information of relationship between said first logical volume and said second logical volume in said first storage device.

35. (Currently Amended) A storage system according to claim 30, wherein:
said first and/or second controller have a pair management information, which
~~of said first logical volume indicates whether it is under copying data from said~~
~~second-fourth logical volume in said first storage device to said first logical volume or~~
not.

36. (Currently Amended) A storage system according to claim 30, wherein:
said first controller has a pair management information of said first logical
~~volume is whether it is under copying data from corresponding to said first logical~~
~~volume to said second logical volume in said first storage device or not.~~

37. (Currently Amended) A storage system according to claim 30, wherein:
said second information processing device sends said command, which are
used to change a pair management information of said first logical volume has
including said first information, said second information, said third information and
said fourth information of a plurality of regions in said first logical volume.

38. (Currently Amended) A storage system according to claim 30, wherein:
said first controller manages Said pair management information of said first
~~logical volume has information of a plurality of regions in said second portion of said~~
first disk drives stored data, which will be copied-transferred from said first-second

logical volume to said ~~second~~ third logical volume in said ~~second~~ storage device, before changing said first information, said second information, said third information and said fourth information.

39. (Currently Amended) A storage system according to claim 30, wherein:
said second controller manages pair management information of said first
~~logical volume has information of a plurality of regions in said third portion of said~~
second disk drives stored data, which will be ~~restored~~ stored from said ~~first~~ third
logical volume to said ~~second~~ fourth logical volume in said ~~second~~ storage device, by
at least one pointer before changing said first information, said second information,
said third information and said fourth information.

40. (Currently Amended) A storage system according to claim 30, wherein:
said first controller manages pair management information of said first logical
~~volume has information of a plurality of regions in said second portion of said first~~
disk drives stored data, which will be ~~copied~~ transferred from said second logical
volume in said ~~first~~ storage device to said ~~first~~ third logical volume, by at least one
pointer before changing said first information, said second information, said third
information and said fourth information, and

said regions stored data include a plurality of regions in which said data corresponding to said data sent from said first information processing device are under storing by said first controller.

41. (Currently Amended) A storage system according to claim 30, wherein:
said second controller manages pair management information of said first logical volume has information of a plurality of regions in said third portion of said second disk drives stored data, in which will be copied said data sent from said first controller are under storing by said second controller from said first logical volume to said second logical volume in said first storage device, before changing said first information, said second information, said third information and said fourth information.

42. (Currently Amended) A storage system according to claim 30, wherein:
said first-second controller transfers said command sent from said second information processing device to said second-first storage device based on contents of said first command.

43. (Canceled)

44. (Currently Amended) A storage system according to claim 30, wherein:

~~—said address is related to a third logical volume in said first storage device and is corresponding to a fourth logical volume in said second storage device; and~~

said ~~first~~second controller transfers said command sent from said second information processing device to said ~~fourth logical volume~~first storage device, based on said ~~if an~~ address of said command sent from said second information processing device is a certain address of a fifth logical volume.

45. (Currently Amended) A storage system according to claim 30, wherein:
said command sent from said second information processing device has an information, which is used to identify said ~~first~~third logical volume from said ~~a~~ plurality of logical volumes.

46. (Currently Amended) A storage system according to claim 30, wherein:
each of said logical volumes has a logical unit number, which is used to identify a logical volume from said ~~a~~ plurality of logical volumes; and
said command sent from said second information processing device has an information of a plurality of said logical unit number corresponding to said third and fourth logical volumes.

47. (Currently Amended) A storage system according to claim 30, wherein:

said ~~first~~ second controller executes contents of said ~~first~~ command sent from
said second information processing device, if said ~~first~~ command sent from said
second information processing device does not have an information of said ~~second~~
first storage device to be transferred.

48. (Currently Amended) A storage system, comprising:

a first storage device coupled to ~~an~~ a first information processing device and
having a plurality of first disk drives, a first portion of said first disk drives being
related to a first logical volume and a second portion of said first disk drives being
related to a second logical volume;

a first controller having a first information indicating that said first logical
volume functions as a primary logical volume and a second information indicating
that said second logical volume functions as a logical volume being used to transfer
data ~~transferring data received from said information processing device in to said first~~
~~disk drives and receiving a command, said command being used to request a pair~~
~~status of a first logical volume from said information processing device, and~~
~~transferring said command~~;

a second storage device coupled to a second information processing device
and said first storage device and having a plurality of second disk drives, a third
portion of said second disk drives being related to a third logical volume and a fourth
portion of said second disk drives being related to a fourth logical volume, ~~said~~

~~second disk drives being corresponding to a plurality of logical volumes which have said first logical volume; and~~

a second controller having a third information indicating that said third logical volume functions as a logical volume being used to receive data and a fourth information indicating that said fourth logical volume functions as a secondary logical volume corresponding to said primary volume~~transferring data to said second disk drives and receiving said command from said first storage device and replying said pair status of said first logical volume,~~

wherein said first controller receives said command~~data sent from said first~~
information processing device to said first logical volume and storing said data sent from said first information processing device in said first logical volume and storing data corresponding to said data sent from said first information processing device in said second logical volume and transferring said data stored in said second logical volume to a second storage device~~an area, which is different area from said first logical volume and a second logical volume forming a pair relationship with said first logical volume.~~

wherein said second controller receiving said data transferred from said first controller and storing said data transferred from said first controller in said third logical volume and storing data corresponding to said data stored in said third logical volume in said fourth logical volume,

wherein said first storage device and said second storage device change said first information, said second information, said third information and said fourth information based on at least one command sent from said second information processing device, if said first information processing device has a failure,

wherein said changed first information indicates that said first logical volume now functions as said secondary logical volume,

wherein said changed second information indicates that said second logical volume now functions as said logical volume being used to receive data,

wherein said changed third information indicates that said third logical volume now functions as said logical volume being used to transfer data,

wherein said changed fourth information indicates that said fourth logical volume now functions as said primary logical volume,

wherein said second controller, after changing said third information and said fourth information, receives data sent from said second information processing device to said fourth logical volume and stores said data sent from said second information processing device in said fourth logical volume and stores data corresponding to said data sent from said second information processing device in said third logical volume and transfers said data stored in said third logical volume to said first storage device, and

wherein said first controller, after changing said first information and said second information, receives said data transferred from said second controller and

stores said data transferred from said second controller in said second logical volume and stores data corresponding to said data stored in said second logical volume in said first logical volume.

49. (New) A storage system according to claim 30, wherein:

said second controller manages a plurality of regions in said third portion of said second disk drives in which data stored in said third portion of said second disk drives are under storing from said third portion of said second disk drives in said fourth portion of said second disk drives by said second controller.

50. (New) A storage system according to claim 30, wherein:

said second controller, after changing said third information and said fourth information, receives data sent from said second information processing device to said fourth logical volume and stores data corresponding to said data sent from said second information processing device in said fourth portion of said second disk drives and stores data corresponding to said data sent from said second information processing device in said third portion of said second disk drives and transfers data corresponding to said data stored in said third portion of said second disk drives to said first storage device.

51. (New) A storage system according to claim 30, wherein:

said second controller, after changing said third information and said fourth information, receives data sent from said second information processing device to said fourth logical volume and stores data corresponding to said data sent from said second information processing device in said fourth portion of said second disk drives and stores data corresponding to said data sent from said second information processing device in said third portion of said second disk drives and transfers data corresponding to said data stored in said third portion of said second disk drives to said first storage device, and

said first controller, after changing said first information and said second information, receives said data transferred from said second controller and stores data corresponding to said data transferred from said second controller in said second portion of said first storage device and stores data corresponding to said data stored in said second portion of said first disk drives in said first portion of said first storage device.

52. (New) A storage system according to claim 30, wherein:

said data stored in said second logical volume is appended an update information, which is used to maintain a consistency when said data stored in said third portion of said second disk drives are stored in said fourth portion of said second disk drives.

53. (New) A storage system according to claim 30, wherein:

said second logical volume and said third logical volume each function as a journal volume in which a journal data stored.

54. (New) A storage system, comprising:

a first storage device coupled to a first information processing device and having a first controller and a plurality of first disk drives, a first portion of said first disk drives being related to a first logical volume and a second portion of said first disk drives being related to a second logical volume;

said first controller having a first information indicating that said second logical volume functions as a logical volume being used to transfer data;

said first controller receiving data sent from said first information processing device to said first logical volume and storing said data sent from said first information processing device in said first logical volume and storing data corresponding to said data sent from said first information processing device in said second logical volume and transferring said data stored in said second logical volume to a second storage device;

said second storage device coupled to a second information processing device and said first storage device and having a second controller and a plurality of second disk drives, a third portion of said second disk drives being related to a third logical volume and a fourth portion of said second disk drives being related to a

fourth logical volume;

said second controller having a second information indicating that said third logical volume functions as a logical volume being used to receive data; and

said second controller receiving said data transferred from said first controller and storing said data transferred from said first controller in said third logical volume and storing data corresponding to said data stored in said third logical volume in said fourth logical volume;

wherein said first storage device and said second storage device change said first information and said second information based on at least one command sent from said second information processing device so that said second information processing device sends data targeted to said fourth logical volume, if said first information processing device has a failure,

wherein said changed first information indicates that said second logical volume functions as said logical volume being used to receive data, and

wherein said changed second information indicates that said third logical volume functions as said logical volume being used to transfer data.

55. (New) A storage system according to claim 54, wherein:

said first controller manages a plurality of regions in said second portion of said first disk drives stored data, which will be transferred from said second logical

volume to said third logical volume, by using at least one pointer before changing said first information and said second information.

56. (New) A storage system according to claim 54, wherein:

said second controller manages a plurality of regions in said third portion of said second disk drives stored data, which will be stored from said third logical volume to said fourth logical volume, before changing said first information and said second information.

57. (New) A storage system according to claim 54, wherein:

said first controller manages a plurality of regions in said second portion of said first disk drives stored data, which will be transferred from said second logical volume to said third logical volume, before changing said first information and said second information, and

said regions in said second portion of said first disk drives include a plurality of regions in which said data sent from said first information processing device are under storing by said first controller.

58. (New) A storage system according to claim 54, wherein:

said second controller manages a plurality of regions in said third portion of said second disk drives in which said data sent from said first controller are under

storing by said second controller, by at least one pointer before changing said first information and said second information.

59. (New) A storage system according to claim 54, wherein:

said data stored in said second logical volume is appended an update information, which is used to maintain a consistency when said data stored in said third logical volume are stored in said fourth logical volume.

60. (New) A storage system according to claim 54, wherein:

said second logical volume and said third logical volume each function as a journal volume in which a journal data stored.

61. (New) A storage system according to claim 54, wherein:

said command sent from said second information processing device is targeted to said second storage device.

62. (New) A storage system, comprising:

a first storage device coupled to a first information processing device and having a first controller and a plurality of first disk drives, a first portion of said first disk drives being related to a first logical volume and a second portion of said first disk drives being related to a second logical volume; and

a second storage device coupled to a second information processing device and said first storage device and having a second controller and a plurality of second disk drives, a third portion of said second disk drives being related to a third logical volume and a fourth portion of said second disk drives being related to a fourth logical volume;

wherein said storage system has a first status including that

said first logical volume functions as a primary logical volume being stored data sent from a primary information processing device, if said first information processing device functions as said primary information processing device sending data,

said second logical volume functions as a transferring logical volume in which data corresponds to an updated data stored in said primary logical volume are stored,

said third logical volume functions as a receiving logical volume in which data corresponds to said data stored in said transferring logical volume are stored, and

said fourth logical volume functions as a secondary logical volume, which forms a pair relationship of a remote copy process with said primary logical volume and stores data corresponding to said data stored in said receiving logical volume,

wherein said storage system has a second status including that

said fourth logical volume functions as said primary logical volume, if said second information processing device functions as said primary information processing device,

said third logical volume functions as said transferring logical volume,

said second logical volume functions as said receiving logical volume, and

said first logical volume functions as said secondary logical volume.

wherein said storage system is changed from said first status to said second status based on one or more commands sent from said second information processing device.

63. (New) A storage system according to claim 62, wherein:

said first controller manages a plurality of regions in said second portion of said first disk drives stored data, which will be transferred from said second logical volume to said third logical volume, by using at least one pointer during said first status of said storage system.

64. (New) A storage system according to claim 62, wherein:

said second controller manages a plurality of regions in said third portion of said second disk drives stored data, which will be stored from said third logical volume to said fourth logical volume, during said first status of said storage system.

65. (New) A storage system according to claim 62, wherein:

said first controller manages a plurality of regions in said second portion of said first disk drives stored data, which will be transferred from said second logical volume to said third logical volume, during said first status of said storage system, and

said regions in said second portion of said first disk drives include a plurality of regions in which said data sent from said first information processing device are under storing by said first controller.

66. (New) A storage system according to claim 62, wherein:

said second controller manages a plurality of regions in said third portion of said second disk drives in which said data sent from said first controller are under storing by said second controller, by at least one pointer during said first status of said storage system.

67. (New) A storage system according to claim 62, wherein:

said data stored in said second logical volume is appended an update information, which is used to maintain a consistency when said data stored in said third logical volume are stored in said fourth logical volume.

68. (New) A storage system according to claim 62, wherein:

said second logical volume and said third logical volume each function as a journal volume in which a journal data stored.

69. (New) A storage system according to claim 62, wherein:

said commands sent from said second information processing device is targeted to said second storage device.

70. (New) A storage system, comprising:

a first storage device coupled to a first information processing device and having a first controller and a plurality of first disk drives, a first portion of said first disk drives being related to a first logical volume and a second portion of said first disk drives being related to a second logical volume; and

a second storage device coupled to a second information processing device and said first storage device and having a second controller and a plurality of second disk drives, a third portion of said second disk drives being related to a third logical volume and a fourth portion of said second disk drives being related to a fourth logical volume;

wherein said storage system has a first status including that

said first logical volume functions as a primary logical volume being stored data sent from a primary information processing device, if said first information

processing device functions as said primary information processing device sending data,

said second logical volume functions as a transferring logical volume being stored data, which corresponds to an updated data stored in said primary logical volume and is transferred to said second storage device,

said third logical volume functions as a receiving logical volume being stored data, which is received from said first storage device, and

said fourth logical volume functions as a secondary logical volume, which forms a pair relationship with said primary logical volume and is stored data from said receiving logical volume,

wherein said storage system has a second status including that

said fourth logical volume functions as said primary logical volume, if said second information processing device functions as said primary information processing device,

said third logical volume functions as said transferring logical volume,

said second logical volume functions as said receiving logical volume, and

said first logical volume functions as said secondary logical volume, and

wherein said storage system is changed from said first status to said second status if said first information processing device has a failure.